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RESIDENTIAL CONSTRUCTION PRACTICES IN ALBERTA (1900-1971)

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Alberta
DEPARTMENT OF HOUSING
Innovative Housing Grants Program

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RESIDENTIAL CONSTRUCTION PRACTICES IN ALBERTA 1900-1971

August 1984

Prepared by:
E.A. Doherty Architect

The views and conclusions expressed and the recommendations made in this report are entirely those of the authors and should not be construed as expressing the opinions of the Alberta Department of Housing.

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Alberta Department of Housing

August 1984

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1

INTRODUCTION

1. INTRODUCTION

1.1 OBJECTIVES AND SCOPE

This reference document has been developed to assist Alberta's homeowners and renovators in the maintenance and upgrading of single-family homes.

The document provides a guide to typical residential construction practices used in Alberta's older housing stock. Problems which may arise as a result of techniques or materials commonly used during a specific period are identified. However, detailed instruction on how to undertake specific repairs are not provided as such information is already available in a wide variety of Government and privately published literature.

The scope of this document is limited to single-family homes which were built in Alberta between 1900 and 1971 for the average family. Dwellings built prior to 1900 are not included in the study, as most were of a temporary nature and have since been demolished; a very limited number of pre-1900 homes are still in existence today and information about Pre-WW I construction may be applicable.

Homes built after 1971 are not included in the study, as they are not for all practical purposes in need of major maintenance or upgrading at this time. A passing reference is made to these homes in order to establish a sense of the historical evolution of single-family homes in Alberta.

Custom-designed homes and extremely large homes of the pre-WWII period are also not included in the scope of the study. These homes, while often similar in construction to more modest homes of the same vintage, generally feature unique fittings, materials and layouts, and do not easily lend themselves to categorization. As a group they comprise a very small percentage of Alberta's housing stock (in Calgary the proportion is estimated at 1/2%*).

* Calgary Assessment Rolls, compiled in March 1983.

1.2 APPROACH AND ORGANIZATION

This manual is a historical reference guide to typical single-family house construction practices used in Alberta between 1900 and 1971. The generic housing types which are documented in this manual are based on style of house and period of construction rather than on other factors such as size or location. Changes in construction techniques in single-family housing have tended to be evolutionary over the course of the 20th century. The classification of house types is facilitated by the cyclical nature of the construction industry in Alberta. Construction techniques and house layouts were generally consistent through a particular boom/bust cycle. Six periods of house contruction practices have emerged; each with distinctive stylistic and technical characteristics:

Period 1	1900 - 1920	Pre-World War II
Period 2	1921 - 39	technology
Period 3	1940 - 45	
Period 4	1946 - 65	Post-World War II
Period 5	1966 - 71	technology
Period 6	1972 - 81	

The number and location of Alberta's single-family homes has been estimated by period of construction based on census and assessment data.

2

SINGLE FAMILY HOUSING TYPES IN ALBERTA

2. SINGLE-FAMILY HOUSING TYPES IN ALBERTA

2.1 INTRODUCTION

During the period between 1900 and 1971, single-family homes in Alberta underwent gradual changes in their planning, style, and construction techniques.

Based on construction materials and techniques in general use, residential construction between 1900 and 1971 may be divided into five periods.

Period 1, between 1900 and 1920, may be characterized as a transition period[1] which featured many changes in the technology. Construction activity peaked in 1911-12; almost no construction occured during and immediately after World War I (1914-20).

Period 2, between 1921 and 1939, featured a fairly standardized residential construction technology. Peak construction activity occured in 1928-31; during the depression years, 1932-39, there was very little residential construction.

Period 3, between 1940 to 1945, saw construction activity peaking in 1945. Significant innovations in technology were introduced during this transition period[1].

Period 4, between 1946 and 1965, led to a more a consistent technology being established, although some homes built between 1946 and 1950 are very similar to those of Period 3. Peak construction activity occured in 1955-58.

---

1 During the transition periods, new construction materials and techniques were introduced. Homes built during these periods sometimes feature items common to the periods before and after. New materials and techniques were often inadequately developed or poorly understood; quality may vary considerably as a result.

Period 5, between 1966 and 1971, consisted of major technological changes. During this transition period, construction peaked in the years 1968 to 1971.

During Period 6, between 1972 and 1981, modern housing techniques were widely used. Improvement in the energy efficiency of homes built during this period has been the single most important innovation.

Innovations in construction techniques or materials are associated with transition Periods 1, 3 and 5. Because the style[2] and planning of homes remained fairly consistent for that particular period, the dating of a particular house may usually be based on the exterior appearance alone.

A quick reference for the typical construction practices of each period is provided in Secton 4.6, starting on page 57. Details of house styles for each are provided in Section 3.0 for each house type in the period, beginning on page 39.

2 The data used to establish the styles and planning of each house type was gathered from Historic Sites, Building Inventory for homes built prior to 1930, from CMHC, and interviews with long-established Alberta builders.

2.2 PERIODS OF RESIDENTIAL CONSTRUCTION IN ALBERTA

Settlement in Alberta started in the 1870s, spurred by the prospect of a railway, the arrival of the Northwest Mounted Police and federal land grants. In the early years, development was concentrated in the southern portion of the province around railway centres and, apart from the NWMP forts and a few well-established ranches, consisted primarily of tents and shacks.

2.2.1 PERIOD 1 - 1900 to 1920

In the last years of the century, the Yukon's gold rush, the disappearance of the American frontier, and major government reforms undertaken by the Minister of the Interior, Clifford Sifton, brought world attention to Canada's western territories. From 1904 to 1913, as immigrants poured into the province, Alberta enjoyed an era of unprecedented construction activity. This boom was brought to an abrupt end by the beginning of World War I. During World War I, construction was at a virtual standstill throughout the province, as men left, many never to return, to fight on the Western Front.

2.2.2 PERIOD 2 - 1921 to 1939

Following World War I, prosperity did not return at once. Immigration resumed in the early 1920s and with it renewed home construction. By the end of the decade, residential construction was again a thriving concern. Most of Alberta's agricultural lands were settled during this period by the new immigrants from the British Isles, Europe, and eastern Canada. Again the boom ended rapidly in 1931 following the collapse of the financial system around the world which led to lowered prices for farm products. Increased foreign tariffs and a series of disastrously dry years further slowed the Alberta economy. Economic and construction activity was severely curtailed throughout the 1930s Depression; in fact, Calgary actually suffered a net reduction in the number of single-family homes between 1931 (15047)[1] and 1941 (14488)[1].

---

1 1931 and 1941 Census data.

2.2.3 PERIOD 3 - 1940 to 1945

A limited number of houses were initiated in the early 1940s to accommodate the needs of the war effort. Wartime housing, produced to house munitions workers and their families, accounted for almost all of the new units during this period. Significantly, this era marked the first government intervention in the housing market.

2.3.4 PERIOD 4 - 1946 to 1965

Following World War II, Alberta, as elsewhere in Canada, was faced with a severe housing shortage; the depression and war years had depleted the housing stock. In addition, returning soldiers were eager to establish long delayed families. The baby boom had started. In Alberta this phenomenon coincided with the first commerical exploitation of Alberta's oil fields in Leduc.

Immediately following the war, the Department of National Defense in conjunction with the newly established CMHC continued to produce homes similar to those produced during the war years, under the Veterans Housing Program. Despite this government assistance, the demand for single-family housing could scarcely be met through the late 1940s and early 1950s, as building materials and skilled workers were in scarce supply.

This pent-up demand coupled with Albert'a growing prosperity resulted in a doubling of single-family units in Alberta's major urban centres between 1941 and 1951 and again between 1957 and 1961.[2] The rural population grew very little and benefitted less from the economic growth so that the numbers of rural houses did not change significantly during this period.

---

1 1931 and 1941 Census data.
2 1941, 1951, 1961 Census data.

2.2.5 PERIOD 5 - 1966 to 1971

The late sixties marked a period of steady growth as opposed to the very dramatic increase of the preceding decade.

2.2.6 PERIOD 6 - 1972 to 1981

Alberta's latest construction boom during the seventies was fuelled by rising oil prices and by rapid growth and immigration. This phase appears to have ended in 1981.

2.3 NUMBER AND LOCATION OF SINGLE-FAMILY HOMES IN ALBERTA

The most common form of housing found in Alberta is the single-family detached house. Based on census data, in 1921, SFD accounted for 97% of all dwelling units, and in 1981 they comprised 62% of the total housing stock.

The single-family detached house is found in all the geographic parts of the province and in all urban areas as well as farming communities. In 1981, urban centres of 10,000 population or greater accounted for 60% of all single-family detached houses, whereas in 1921 they accounted for only 22%. Table 1, page 9 illustrates the distribution of single-family detached dwellings over the years in the Province of Alberta.

TABLE I - SINGLE FAMILY DETACHED HOMES BY CENSUS YEAR AND LOCATION

Year	Calgary[1]	Edmonton[1]	Lethbridge[2]	Medicine Hat[2]
1981	115460	129030	13620	10550
1976	90765	100345	10575	7585
1971	73055	90205	9200	6600
1961	50802	61800	7152	5199
1951	24300	31700	4250	3015
1941	14888	16295	2678	2167
1931	15047	14769	2478	2206
1921	12294	11888	2148	2077

Year	Red Deer[2]	Grande Prairie[2]	Rural[3]	Total for Alberta
1981	8355	4040	191495 (40%)	473340
1976	5355	3520	154275	372420
1971	4630	2500	143410	329600
1961	3213	1786	142116	272069
1951			140735	204000
1941			135893	171621
1931			125338	171621
1921			104178 (78.6%)	132575

1 represents the metropolitan area
2 represents a city of 10000 or greater
3 represent all areas excluding thoses defined in 1 and 2.

NOTE: all statistics from Census of Canada for year identified.

2.3 NUMBER AND LOCATION OF SINGLE-FAMILY HOMES IN ALBERTA

Table II provides an estimate of the number of single family dwellings in Alberta by period of construction. Compared to the rest of Canada, Alberta's SFD stock is relatively new. In Alberta only 15% was built prior to 1945 compared to 25% for the total Canadian stock; forty-five percent was built in the period 1946-71 compared to 32% nation wide; and some 40% were built in the period 1971-81 compared to only 33% of Canada's total stock.

TABLE II ESTIMATED SINGLE FAMILY DWELLLINGS BY PERIOD OF CONSTRUCTION FOR ALBERTA [1]

	No. SFD in 1971	Estimated SFD for 1981	Estimated SFD loss 1971-81	% SFD to total SFD in 1981
Period 1 prior to 1921	36,230	21,620	19,460	4.6
Period 2 & 3 1921-1945	63,405	50,000	16,705	10.6
Period 4 1946-65	189,265	169,305	19,960	35.8
Period 4a 1946-60	140,110	120,150	19,960	25.4
Period 4b 1961-65	49,155	49,155	negligible	10.4
Period 5 1966-71**	40,105	40,860	negligible	8.6
Period 6 1971-81	- -	193,565	negligible	40.9
Totals	329,015	473,190	56,129	

** first 5 months of 1971 only

1 Refer to Appendix A for additional information on estimates.

2.3 NUMBER AND LOCATION OF SINGLE-FAMILY HOMES IN ALBERTA

Tables III and IV provide an estimate of the number of single family dwellings in Calgary and Edmonton by period of construction.

TABLE III - ESTIMATED SFD BY PERIOD OF CONSTRUCTION FOR CALGARY[1]

	SFD in 1971	Estimated SFD in 1981	Estimated SFD loss 1971-81	% SFD of total
Period 1 prior to 1921	6,065	3,340	2,725	2.7
Period 2 & 3 1921-1945	8,155	7,290	965	6.1
Period 4 1946-65	46,750	41,575	5,175	35.0
Period 4a 1946-60	34,655	29,965	4,690	25.1
Period 4b 1961-65	12,095	11,610	485	9.7
Period 5 1966-71	12,080	11,595	485	9.7
Period 6 1971-81	- -	57,665	negligible	48.6
Totals	73,055	115,845* (121,465)	9,250	

* Actual Census data; bracketed number is sum of estimates

1 Refer to Appendix A for additional information on estimates.

TABLE IV - ESTIMATED SFD BY PERIOD OF CONSTRUCTION FOR EDMONTON(1)

	SFD in 1971	Estimated SFD in 1981	Estimated SFD loss 1971-81	% SFD of total
Period 1 prior to 1921	5,060	2,395	2,665	2.2
Period 2 & 3 1921-1945	12,330	8,460	3,870	7.6
Period 4 1946-65	60,555	50,715	9,840	45.7
Period 4a 1946-60	45,125	37,290	7,835	33.6
Period 4b 1961-65	15,430	13,425	3,005	33.6
Period 5 1966-71	11,965	10,410	1,555	9.4
Period 6 1971-81	- -	38,885	negligible	35.1
Totals	89,910	100,680* (110,865)		

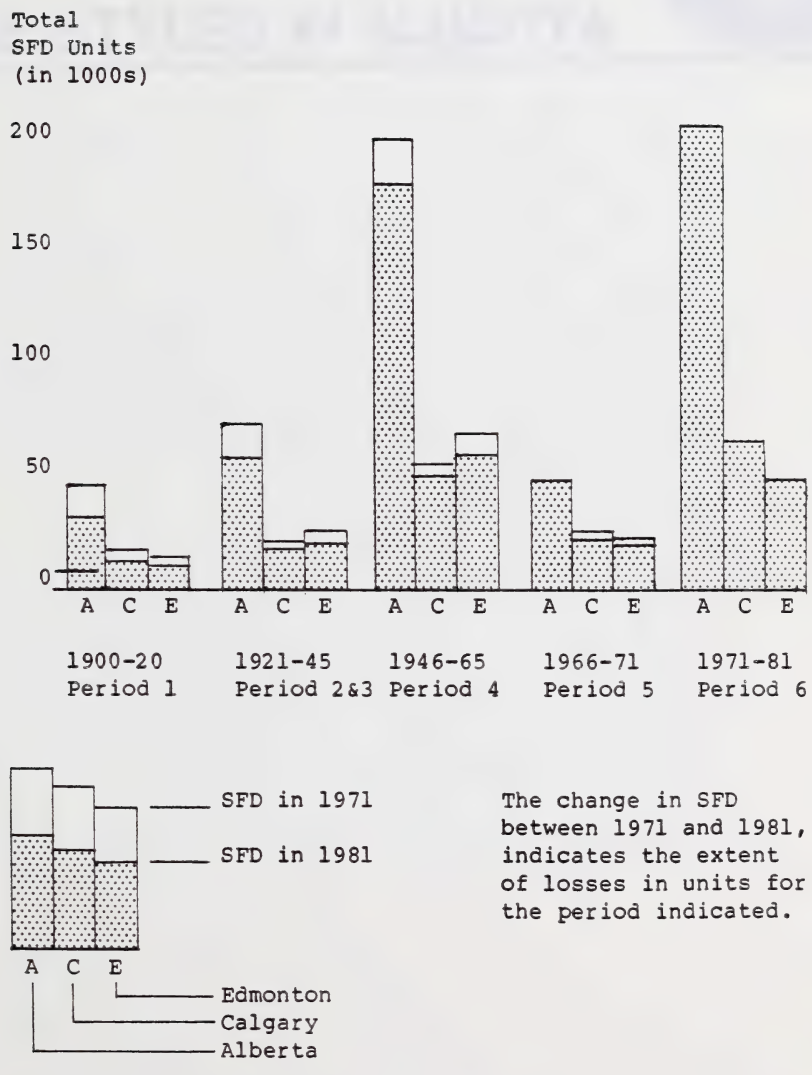
* Actual Census data; bracketed number is sum of estimates

1 Refer to Appendix A for additional information on estimates.

2.3 NUMBER AND LOCATION OF SINGLE-FAMILY HOMES IN ALBERTA

CHART I graphically summarizes the distribution of SFD in Alberta, Calgary and Edmonton by period of construction.

CHART I - SFD BY PERIOD OF CONSTRUTION FOR ALBERTA, CALGARY AND EDMONTON(1)



The change in SFD between 1971 and 1981, indicates the extent of losses in units for the period indicated.

(1) Refer to Tables II, III, IV.

3

SINGLE FAMILY HOUSE STYLES IN ALBERTA

3. SINGLE FAMILY HOUSE STYLES IN ALBERTA

3.1 INTRODUCTION

House plans and styles have varied over the period from 1900 to 1971. They provide a useful tool for dating the construction period of the home. The following section provides details of the major house styles popular in Alberta during this time.

3.2 PERIODS 1 and 2-PRE-WORLD WAR II HOMES IN ALBERTA (1900-1939)

House styles and plans were derived from Eastern Canadian, American, and English architectural sources. House patterns were widely advertized throughout North America by architects and house builders in newspapers and magazines; numerous pattern books were also available and frequently consulted by local house builders. Albertans were also particularly influenced by housing trends in California, particularly the 'Craftsman' type bungalow popularized by the Greene brothers at the turn of the century. Westerners' preference for bungalows or ranch-style homes was evident as early as 1909.

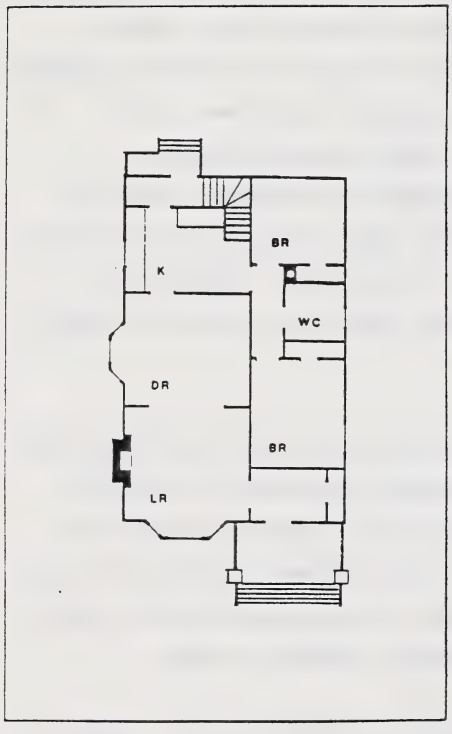
With the exception of custom-designed and built homes, pre-World War II homes are easily identified and categorized based on exterior style alone. Construction techniques for all styles through the first two periods 1900-20 and 1921-39 are similar; certain practices which were rarely used before World War I became commonplace after the war, for example, concrete foundations replaced stone.

The common house styles during Periods I (1900-20) and II (1921-39) are:

a) the Craftsman bungalow
b) the Homestead House
c) the American Foursquare
d) other common styles
    i) the Settler's House
    ii) Carpenter Gothic
    iii) the Executive homes.

3.2.1 The Craftsman Bungalow

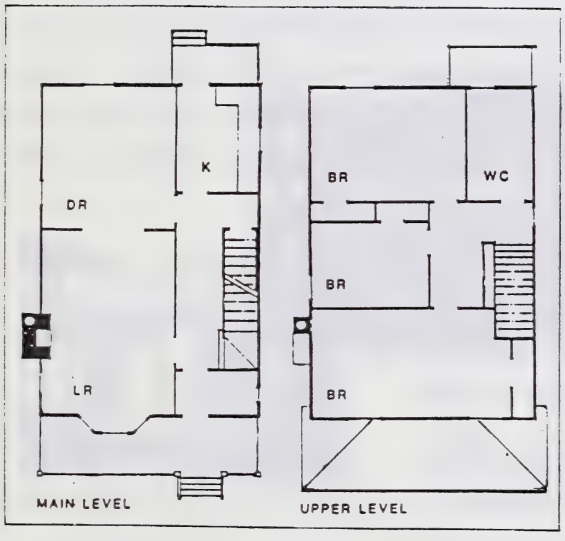
In Alberta, this bungalow was one of the most popular house forms during the 1909 boom and the '20s; these bungalow homes show the influence of the Californian 'Craftsman' style in Alberta: massive porch columns, deep roof overhangs, roof brackets, and use of natural materials typified this style. Occasionally a small second floor was added. These early bungalows provided the inspiration for much of the later housing in Alberta, notably the wartime houses and the ranch-style bungalows.



3.2.2 The Homestead House

In the early years of the 20th century, the emerging urban working class in Alberta's cities provided a market for the Homestead house. Fitted with electricity, a servantless kitchen, indoor plumbing and bathroom, this home remained popular into the early '20s.

The typical Homestead House featured a porch along the full length of the front elevation, a main entrance gable end, and simple exterior finishes (wood siding and wood shingles). In some cases the attic floor was developed. The tri-gabled Ell, an early 1920s variation of this basic home, is most commonly found in rural parts of Alberta; this unit provided an extension to the side of the basic unit.



3.2.3 The American Foursquare

The American Foursquare appeared during the first decade of the 20th century and remained popular through the twenties. In Alberta, this simple "box" style was commonly built in the new suburbs which were developed during the 1909-1913 boom; during the 1920s many were also built as farmhouses.

These basic two-storey houses are distinguished by their hip roof. Often they included a developed attic and almost always featured a porch running the full length of the front elevation. These relatively simple homes were finished in wood siding, wood shingles and stucco; occasionally brick was used. In Alberta, the Californian 'Craftsman' style influence can be seen in many of these homes. Both a centre hall and side hall (similar to the Homestead plan) floor plan are found. The centre hall is less common and is normally found only in the larger, better-built homes of the period.

Floor Plan similar to Homstead
shown on page 16.

3.2.4 Other Common Styles

The Settler's House

This predominantly rural house form was built to accommodate rural farm workers during the first two decades of this century. Similar homes were built in the cities; although these were usually somewhat larger. These modest four or six-room homes usually featured a porch running the full length of the front elevation. Often built of brick, they were distinguished by their hipped roofs and central chimney. Because of their small size and poor construction quality, these homes are relatively rare today.

Carpenter Gothic

In the period immediately before and after World War I some rural homes were modelled on the Carpenter Gothic style. Derived from the design of farm homes of Ontario and eastern Quebec, these homes were generally more modest than their eastern counterparts; the elaborate decorative millwork normally associated with this style is often absent, lost to 'modernization' programs. As in Eastern Canada, brick was often used. This particular style is limited to rural areas of Alberta and is relatively rare.

These units were very small and provided only 2 or 3 rooms.

The Executive Homes

During the period before World War II well-to-do Albertans built substantial, even imposing homes. Many of these very early mansions (pre-World War I) have been demolished to make way for new downtown development. The few that remain are now generally designated as historic resources.

Comfortable homes built during Period II (1921-39) now constitute a substantial portion of the homes in the most exclusive inner city neighbourhoods. Generally these homes were built in the most fashionable architectural styles of their era and feature substantially better interior finishes than the majority of homes built during this period. Although these homes comprise only a small portion of the total housing stock of the period, they influenced the builders of more modest housing. Details in the Princess Anne and Revival Styles may sometimes be found in the more modest homes of the era.

The Princess Anne

Derived from the exuberant Queen Anne style of the Victorian era, these homes retained its central floor plan, prominent staircase, and asymmetrical massing (multiple gables, roofs, bay windows and occasional turret). However, the Princess Anne home of Period I (1900-21), featured much simpler decorative features than its predecessor, relying on clapboard and/or shingles for the exterior treatment.

The Revival Styles

Following World War I, the romantic revival in England heavily influenced the design of the better Alberta homes. The Tudor Revival, English Cottage Style, and English Country House Style were all used often in combination in the new suburbs of the twenties.

3. SINGLE FAMILY HOUSE STYLES IN ALBERTA

To a lesser degree, the Romantic Revival which occurred in the United States at this time also influenced Alberta's homebuilder; examples of the Colonial Revival and Dutch Colonial styles are also found in the suburbs of the twenties.

1

1. Revival
2. Princess Anne
3. Revival California influence

NOTE: Floor plans vary considerably

2

3

3.3 PERIOD 3 - WARTIME HOUSING 1940-45

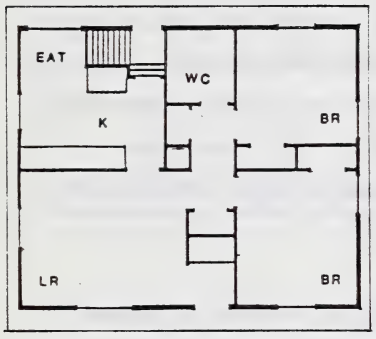
During the Second World War, the Canadian Government initiated a building program to house munitions workers near their place of employment. Three basic house designs were built during this period.

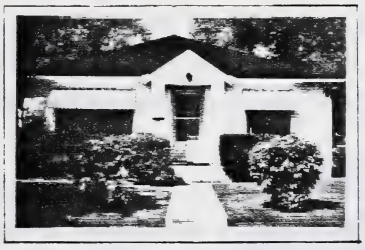
The units were small, efficient and modest. The three types were built in most parts of Canada with few modifications. Type C, the largest, a 1-1/2 storey model was the most common unit type during this period. Type A which closely resembles Type B was almost never built in Alberta.

Wartime housing was the first modestly priced suburban housing. The homes were built on fairly large lots (up to 50' wide) and turned on the site such that the broadest side faced the street. Front yards were susbtantially deeper than in earlier forms of housing. In areas where new land subdivision was required to accommodate these homes, efforts were made to emulate the winding street patterns and integral open green areas normally associated with only the best neighbourhoods up to that time.

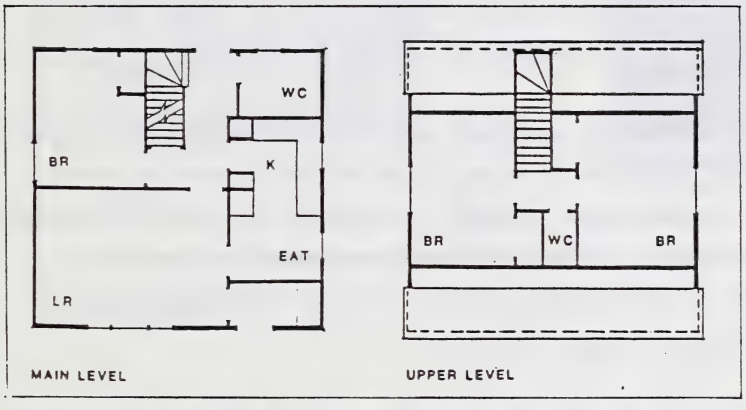
3.3 PERIOD 3 - WARTIME HOUSING 1940 to 1945

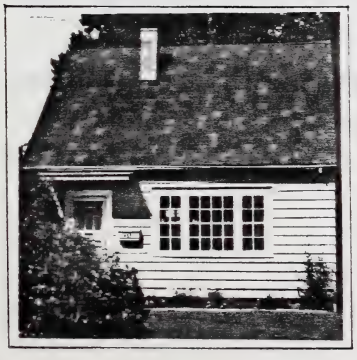
WARTIME HOUSING-TYPE B

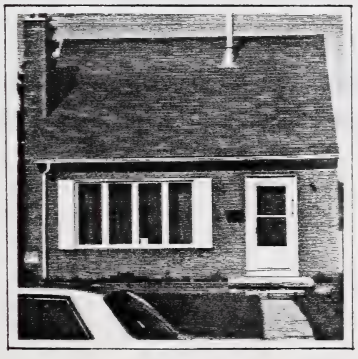




WARTIME HOUSING-TYPE C







3.4 PERIOD 4 - HOUSING FROM 1946 TO 1965

Alberta's rapidly expanding oil industry followed the Leduc discovery and, coupled with the baby boom, created a large demand for housing in the years following World War II.

Initially, though the units were somewhat larger, the basic house resembled the two bedroom bungalows produced during the war years; many of these early post World War II homes were built under the Veterans Rental Housing Program sponsored by the Department of National Defence and by Canada Mortgage and Housing Corporation (CHMC).

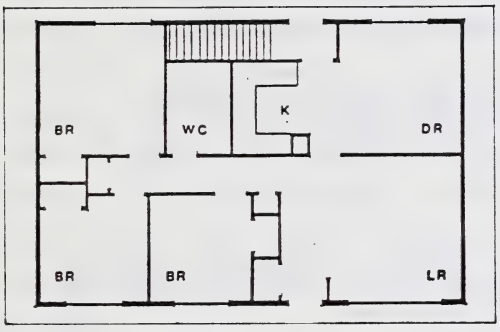
By the mid-fifties, however, growing families created a strong market for three-bedroom bungalows. Although the bungalow remained the preferred housing form, the split-level and the bi-level were introduced in the early 1960s and the two-storey house in the mid-1960s. These new designs were larger than the basic bungalow and reflected the rising standard of living in Alberta.

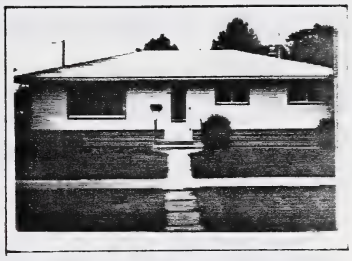
The basic bungalow concept remained substantially unchanged; variety was introduced by means of different roof styles, exterior claddings, and architectural styles, by varying lot and house sizes, and by the introduction of new neighbourhood planning concepts. During this period CMHC played a major role in developing and disseminating standard house designs.

At first, subdivision design was undertaken by local municipalities and varied little from pre-war patterns. Private sector land development companies undertook subdivision planning and development in the late 1950s and were influenced by the emerging trends in California.

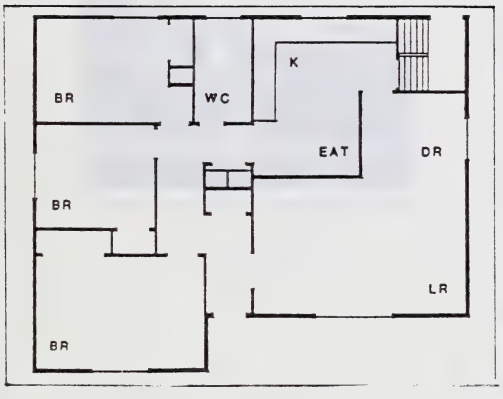
3.4 PERIOD 4 - HOUSING FROM 1946 TO 1965

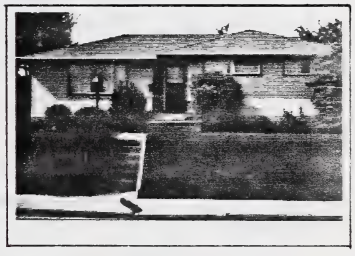
THE LATE FIFTIES BUNGALOW





THE EARLY SIXTIES BUNGALOW



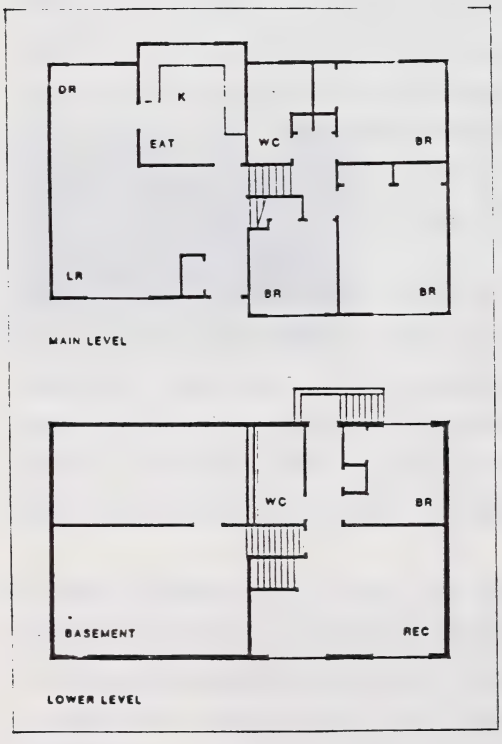


3.5 PERIOD 5 - HOUSING FROM 1966-71: Split, bi-level, 2-storey

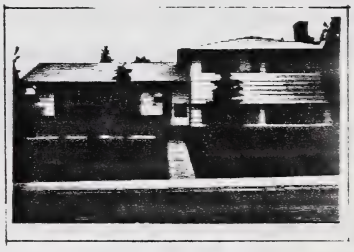
During this period, homes increased in size although lots sizes remained unchanged. As a result, the split-level and the newly introduced 2-storey units enjoyed considerable success.

This era is marked by the introduction of new construction techniques and materials and the final disappearance of most pre-war practices.

Subdivision design had evolved and typically included curvilinear streets and cul-de-sacs as standard practice.



THE LATE SIXTIES SPLIT



3.6 PERIOD 6 - 1972-81: A Decade of Choice

This most recent decade saw a multiplicity of housing types, form, and style. Builders introduced distinct and unique plans. Housing choices increased dramatically, reflecting the increasing variety of lifestyles among Albertans. One cannot easily categorize these designs. The market saw the introduction of more architectural features, two-storey spaces, loft spaces, cathedral ceilings, family rooms, master bedroom suites. Although the market was dominated by a relatively small number of builders, housing in this period was increasingly customized to suit particular segments of the housing market.

Changes to construction practices included energy conservation (mainly through better insulation and air sealing techniques) and a wider variety of building and finish materials.

3.7 SUMMARY OF SINGLE-FAMILY HOUSE STYLES IN ALBERTA

A general idea of the relative frequency of different house styles in Alberta has been derived from the assessment records for the City of Calgary and is illustrated in Chart II.

CHART II - DISTRIBUTION OF SFD BY HOUSE TYPE FOR CALGARY 1983[1]

HERITAGE STYLES - Periods 1 & 2 - 1900-39

FOUR-SQUARE

1.8%

HOMESTEAD

1.8%

BUNGALOW

4.3%

TRANSITIONAL STYLES - Period 3, 1940-45

1-1/2 Storey

1.7%

BUNGALOW

1.0%

MODERN STYLES - Periods 4, 5 and 6

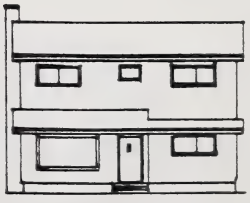
BUNGALOW

59.7%

SPLIT-LEVEL

16.4%

(1960-83)



2-STOREY

14.4%

(1965-83)

1 Refer to Appendix A for discussion of percentage estimates.

NOTE: Percentages may not add up to 100 due to rounding off error.

4

CONSTRUCTION PRACTICES IN ALBERTA

4.1 INTRODUCTION

As for housing plans and styles, construction practices are closely associated with the period of construction. The following section provides details of typical house construction practices and materials. A summary is provided in Section 4.6

4.2 PERIODS 1 & 2 CONSTRUCTION PRACTICES (1900 - 1939) (Pre-World War II Technology)

4.2.1 Introduction

This section provides an outline of the typical construction materials and techniques used between 1900 and 1939. It should be noted that the period 1900 to 1914 was a transitional period in the construction industry. As a result, certain more "modern" practices were not yet fully accepted by builders. This resulted in the continued use of some pre-1900 practices in some homes. Generally, larger, better built homes featured more modern construction practices than more modest homes. Most homes in urban areas were built by local builders. A few homes were assembled by builders from house kits provided by local or British Columbia lumber companies.

Homesteaders, however, were often obliged to build their own homes; those homes sometimes featured elements and layouts typical of construction techniques used in Eastern Canada, the U.S., or Europe. While most of these homes have been replaced over the years, a few remain in rural areas and bear testimony to the early settlers' European or eastern Canadian background; examples include log homes built by Ukrainian settlers in the areas north and east of Edmonton.

4.2.2 Foundations

Most homes featured full basements (at least seven feet clear) constructed of concrete; the concrete was, however, often of very poor quality due to poor grading of aggregates, the use of river stones as aggregate, poor compaction, and use of mineral-laden water in the mix. These concretes can be subject to deterioration under adverse conditions such as sulphate-rich soils and conditions of poor drainage, but generally provide a sound, long-lasting foundation.

In the period 1900-1910 concrete was not the common foundation material. The better built homes featured rusticated or rubble stone or sandstone foundations occasionally set on concrete footings. If drainage has been a problem, these stone foundations may require extensive work. Many modest homes were built with no basement; the foundation consisted of mud sills (wood beams on grade); severe foundation problems are to be expected and have often led to underpinning at a later date.

4.2.3 Structure

Most homes were wood frame. Exterior walls were balloon framed. All walls were of 38 x 89 mm[1] (2"x4") construction on 400 mm (16") centres, with 150 mm to 250 mm (6" to 10") wide boards (sometimes shiplapped) installed diagonally or horizontally as sheathing. Building felt was applied over the sheathing and covered with a variety of claddings. Floor joists 150 mm to 250 mm (6" to 10") were covered with a subfloor of 100 mm to 200 mm (4" to 8") wide boards laid diagonally across the structural members, with a finish flooring material of hardwood strip flooring, softwood flooring with linoleum or ceramic mosaic tile (in bathrooms only).

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1 Standard structural members are always larger than today's common sizes, ie. today's nominal 2x4 (referred to as a 38 x 89 mm wood member today) is actually 1-1/2" x 3-1/2" (38 x 89 mm), whereas old lumber sizes approached the stated dimensions. Sheathing and subfloor boards were generally 19 mm (3/4") thick.

Rafters, generally 38 x 89 mm (2x4) at 400 mm (16") or 600 mm (24") o.c., were used for roof construction and covered with boards as sheathing.

Generally framing members were more substantial in the higher quality homes. Poor construction practices such as undersized joists and rafters, scabbed joists and studs, and inadequate supports, particularly in basements, are more common in the smaller modest homes. Inadequate structural elements are occasionally seen in the better homes, but are generally less severe.

Brick was not used extensively in Alberta, however it was used as a veneer cladding in better homes in urban areas. Brick homes are usually brick veneer over standard wood framing.

Brick homes built before 1914 are often of load-bearing brick with wood framing for floors, interior partitions, and the roof. Evidence of load bearing brick may be seen from the exterior of a home; a pattern of five stretcher courses and one header course is evident.

Throughout Alberta, local brick, in a colour range from buff/pink to deep red, was used; the material was soft and often susceptible to weathering; occasionally brick was painted to hide the poor colour match of the bricks used or to provide a more water resistant cladding. Because this local brick is soft and porous, it is particularly vulnerable to water damage resulting from poor flashings at windows or deteriorated roofing and gutters. Sandblasting cleaning techniques can also damage this type of brick.

NOTE:
A lime based mortar was always used; repairs to these brick homes should NEVER be undertaken with the stronger Portland cement based mortars, as these can cause the brick edges to shatter, or the bricks to crack.

4.2.4 Exterior Cladding

Wood Clapboard was the most common finish; the material was 4" wide and painted.

Cedar Shingles, often cut to provide a decorative treatment, were stained or painted. Shingles were popular in 'Craftsman' style homes, and originally left to weather naturally. As these shingles tended to deteriorate rapidly in Alberta, they have often been stained or painted in the intervening years.

Stucco, in the early years, was used in combination with wood for the half-timbered look. Later (1920s and 30s), stucco was a common finish material for the whole building; three coats of stucco on wood or, later, metal lath were provided. The stucco was probably left natural at first, but over the years most stucco has been whitewashed or painted.

Brick Veneer rather than load bearing brick was usually used on Alberta homes as stated previously.

4.2.5 Insulation

Most often no insulation was installed in homes prior to World War II. Where it was provided, the insulation in the walls and attic areas was usually wood shavings; compacted newspaper, straw, wool, were also occasionally used. These materials were not very effective and their use appears to have been somewhat haphazard. Vapour barriers (or more correctly vapour retarders) were unknown until after World War II. Originally the lack of a vapour retarder posed few problems as homes leaked much more air than is the case in today's construction. Problems may, however, appear as a result of attempts to seal and insulate the building or following the introduction of humidifiers, showers, and clothes dryers; both types of action increase the levels of humidity in the building. These higher levels of humidity cause more mositure to move through the

exterior wall and may create a wide range of problems: spalling brick, rotting framing members, deteriorating stucco and peeling paint on siding.

4.2.6 Roofing

Cedar shingles, usually painted, were the most common roofing material prior to World War II.

Asphalt shingles were introduced in the 1930s, but their use was not widespread; they resembled today's product but were less durable.

Built-up or tar and gravel roofing (1930s and 40s) and ceramic roof tiles (1920s and 30s) were limited to the custom housing market.

Soffits and fascias were wood, usually painted; 4" T&G boarding was common for soffits. In Craftsman style homes, rafter ends are usually exposed; no soffits were provided and fascias were limited to the gable ends; originally these elements were left natural or stained but most often have been painted.

Eavestroughing was provided in most cases. Usually of galvanized metal, eavestroughs were sometimes built of wood in modest homes. Deteriorated and missing eavestroughing is one of the most common problems in the housing of this period; fascias, rafter ends, sheathing and upper wall finishes may suffer from rot in severe cases. Eavestrough leads often deposit water against foundations, resulting in localized deterioration of foundations and basements.

4.2.7 Interior Partitions and Millwork

Wood lath and three coats of plaster were normally applied to all interior walls and ceilings.

Wood wainscotting[1], panelling, and decorative ceiling beams are often found in the better homes. The panelling consisted of solid wood sections and mouldings, usually of oak, surrounding wood veneer panels (birch or oak veneers attached with water-soluble glues to narrow 100 mm (4") softwood boards). Narrow tongue and groove panelling installed vertically as a wainscott was a popular kitchen wall finish.

Millwork was usually substantial and featured elaborate profiles; baseboards 200-300 mm high (8"-12"), door and window casings, picture rails, doors, etc. were of solid wood; oak in better homes, fir or birch in the more modest houses. Millwork was usually stained a fairly dark shade and varnished.

4.2.8 Windows and Doors

Doors were always panelled. Panels were small as boards were used as insets. Hardware was usually solid brass; mortise locksets were used; interior door knobs were usually brass but may have been glass or in rare instances white porcelain.

Window styles (ie. patterns of mullions and muntins) varied considerably depending on the house style and quality of construction. Normally double hung with a counterweight system, windows were almost always provided with removable storm sash. Panes were small and single glazed; sometimes leaded glass was used in 'Tudor' style homes. Casement style windows were occasionally used in the English Cottage styles. Shutters were a common decorative feature but were not operational.

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1 Wood panelling or vertical T&G boarding to approximately 1200 mm (4'-0") height on walls.

4.2.9 Wall Finishes

Usually oil-based paint was used, although wallpapers were popular in the principal rooms. Particularly prior to the First World War, paint colours were dark and often garish. Colours became progressively lighter throughout the century.

4.2.10 Ceiling Finishes

Decorative plaster work (cove and texture) was often installed to ceilings; pre-cast plaster ceiling medallions were popular and usually featured a lighting fixture at the centre.

4.2.11 Flooring Materials

Hardwood Strip Flooring (with varnish finish) was the most common flooring material on the main level. The strips were sometimes as thin as 10 mm (5/16") thick by 38 mm (1-1/2") wide, usually oak, though maple was used. Sometimes decorative borders of contrasting coloured wood (ironwood, teak, etc.) were used. These exotic woods gained only limited distribution due to their cost; in southern Alberta, particularly, these woods were subject to excessive cracking due to the dryness of the climate. During the 1930s, 19 mm (3/4") or 10 mm (3/8") thick by 50 mm (2") wide flooring was used extensively; both maple or oak flooring were used.

Softwood floor boards (50 mm to 150 mm (2" to 6") were used on the upper floor of many homes. Generally not intended as the final flooring material, these wood floors wear quickly and are difficult to maintain.

Ceramic tile was limited to bathrooms; it was primarily unglazed ceramic mosaic tile. Imported glazed tiles were usually installed to fireplace surrounds.

Prior to 1914 "floor cloths," the forerunners of the resilient floor covering, were used; as these had very short life expectancies it is unlikely that any are still in use today. Linoleum was introduced after World War I and gained rapid acceptance for kitchen areas in particular. Because the material was not as hard-wearing as present-day materials, the homeowner may find as many as four layers in older homes. Newspaper was often used as a pad between the layers of linoleum.

4.2.12 Electrical

In urban centres electrical service was the rule after the First World War. In rural areas, electrification proceeded slowly through the pre- and post-World War II period, and was only in general use by the 1950s.

Knob and tube wiring was used; this system of electrical wiring consisted of single copper wires covered with braided cloth sheath run through procelain tubes and around porcelain knobs. The porcelain elements support the wiring in the wall cavity and insulate it from the structure of the building. While the wiring can be safe if properly installed and not overloaded, it is subject to specific problems, which dictate replacement: the wire and insulating porcelain elements are easily damaged; once damaged the system is subject to short circuits and is a potential fire hazard. Overloading is also a very real problem, as homes of this period were provided with only minimal electrical service and very few electrical outlets. A low amperage service (30 amps) was usually installed to provide lighting only. Knob and tube wiring systems generally feature two-pronged ungrounded receptacles, pushbutton or toggle-type switches, and fuses (for circuit protection).

4.2.13 Plumbing

By the turn of the century, Alberta's major urban centres were providing city water and sanitary sewer service. Rural homes drew their water from nearby water courses or wells and outhouses were the norm.

Within the home, galvanized steel pipe was used for hot and cold water supply lines. Lead piping which can pose a health problem does not appear to have been used in Alberta.

Drainage piping, waste and vent, was predominately cast-iron for 3" diameter pipe and larger; galvanized pipe was used for the smaller sizes.

Domestic hot water heaters were in use in the early 1900s, but were not common in the more modest homes. The first heaters were coal-fired boilers with storage tanks. Water was heated only as required for bathing and laundry.

In the 1920s two types of gas fired hot water heaters were introduced; the automatic storage water heater and the side arm (coil type) heater with separate storage tank. The second type of heater was also commonly referrred to as the "cone heater." This heater gave the appearance of consisting of two pieces of equipment, a galvanized storage tank with a side-mounted heater. The automatic heater resembled more modern heaters except that the galvanized storage tanks did not have a glass lining.

4.2.14 Heating

Coal was the major source of fuel until the Second World War. Its use was slowly eroded from 1912 onward as major cities and towns installed natural gas pipelines. Fuel oil had a very small share of the market in Alberta; its use in rural areas persisted due to the

unavailability of piped gas. Propane fuel was used mainly for temporary housing facilities such as job site crew shacks.

Coal has been almost completely replaced by natural gas as a fuel. The owner of a home built before World War I may, however, find evidence of the original heating system; coal bins were not usually removed; instead the new meter, appliance or storage tank was installed in the bin; an access door from the bin to the exterior was always provided and is probably still evident; appliances were connected to a masonry, concrete block (rarely), or brick chimney. In many cases coal-burning furnaces were converted to gas during the 1930s.

Although fuel oil is relatively rare in Alberta, some outlying areas still use this fuel and appliances will be oil power burners; an oil storage tank will be located outside or adjacent to the building or in the basement; the tanks are usually oval. Piping to the appliances is small diameter (10-15mm) copper pipe. Heating appliances are connected to a masonry or metal chimney and bear a name plate indicating the type of fuel used.

Several types of heating systems were used during this period, low pressure steam, gravity hot water, gravity warm air, forced warm air

Gravity Warm Air Systems were the most common in smaller to moderate size homes, bungalow and two-storey, from 1900 to 1939. Generally warm air systems were less expensive to install than hot water or steam systems and were therefore the most common system used. A gravity furnace was not equipped with a fan. The heated air rose by convection through the large ducts to heat the home and cooler air dropped down by gravity back to the furnace. These furnaces are always round and have a fire box located lower than in modern units

The furnace could be fired with coal, fuel oil, natural gas, propane, or electricity. These furnaces often have a long life expectancy and some have lasted more than 50 years. Many have withstood the transition from hand-fed to stoker-fed, to fuel oil or natural gas conversion.

Temperature in larger dwelling units would vary considerably. Rooms closest to the furnace would receive the warmest air and thus would remain warmer than end rooms. Supply air registers were located at a low level on interior walls. Registers were usually cast iron, approximately 300 mm (12") by 300 mm (12").

Trunk ducts were normally manufactured from galvanized sheet metal.

Low Pressure Steam Systems were used in Executive style homes from the year 1900 onward. Usually the area of the dwelling unit was greater than 275 m^2 (3000 square feet).

The boilers produced steam at relatively low pressure, 2 psig to 12 psig, which was transported through black steel piping to cast iron columnar type radiators and/or the lower more modern type baseboard heaters. Control of room temperature was achieved by a central thermostat or by opening and closing a valve on each radiator. The boiler was usually located at the lowest point in the dwelling unit. All piping and heating radiators had to be located above the boiler to permit return of condensate. For this reason radiators in lower floors were located at a high level, normally near the ceiling.

Gravity Hot Water Systems were also used in Executive style homes between 1900 and late 1940s. Area of dwelling units vary from 140 m^2 (1500 s.f.) and up.

The boiler produced hot water at approximately 85° C (180 F), which was conveyed through black steel piping, 38 mm to 50 mm (1-1/2" to 2"), to free-standing cast iron radiators. Circulation was created through the natural tendency for hot water to rise, thus, as in steam systems, the boiler was always at the lowest point in the dwelling unit with piping and radiators at a higher level.

Boilers could be fired with coal, fuel oil, natural gas, propane, or electricity. Normal life expectancy is 20 to 30 years where no anti- corrosion procedures have been undertaken. If corrosion protection procedures have been properly carried out, it is possible for a system to be in good working order today.

The system will provide an even room temperature. Free-standing cast iron radiators were commonly used in systems built prior to 1945; low, more modern style baseboard cabinets became available in the mid-1940s. Homes with a mixture of both types would indicate that renovations and/or repairs have been made to the system.

Since the water temperature is 85° C, exposed radiators can cause burns. Water systems require qualified service people on a periodic basis to ensure proper operation and protection from pipe corrosion. Replacement and/or repairs can be expensive.

Piping in closed circuit water systems has an indefinite life expectancy if proper protection against corrosion is given. Evidence of leaking, for example, water stains on adjacent materials or at joints, would indicate that repairs are necessary.

Boilers were built with round fire pots and were not equipped with insulated jackets. Most boilers were hand-fed with coal. Conversion to automatic stoker feed was introduced late in the 1930s.

4.2.15 Fireplaces

By the turn of the century fireplaces were no longer the primary source of heat in most Alberta homes. Wood and coal burning stoves were limited to rural areas and were rapidly being replaced by the boilers and furnaces described above. Fireplaces were still popular, however, for aesthetic and traditional reasons. Generally a fireplace was provided in the living room and occasionally in a study or the master bedroom. By the twenties fireplaces were often electric or gas radiant heating element equipped with a brick masonry chimney. Many of these fireplaces have not been used over the past years and homeowners should ascertain that the flue is adequate and in good condition prior to reactivating an old fireplace. Gas fireplaces are not suitable for wood burning and must be extensively rebuilt to burn wood.

Fireplaces were often elaborately decorative elements, featuring specialty millwork (mantels), glazed ceramic tile, and cast iron decorative elements.

4.2.16 Bathrooms

Bathrooms included a bathtub, sink, and toilet. Showers were occasionally installed in custom homes, but were not widely used. The bathtub was free-standing enamelled cast iron often featuring a claw foot detail. Sinks were generally free-standing, pedestal type, although built-in vanities were occasionally installed in western homes. The toilet was a raised cistern type. Fittings were either brass or nickel plated; porcelain handles were common. Generally the toilet has been replaced; sinks were also often replaced, although many pedestal types are still in use today. The bathtubs usually survive due to the difficulty of removing them. In larger homes, a separate room was often provided for the toilet.

Ceramic wall and floor tile were normally installed. The wall tile usually extended approximately one meter (3-4 feet) up the wall.

Both fittings and fixtures of the era are now back in production and it is often possible to replace broken or missing fixtures and trim. The porcelain finishes gradually wear out; refinishing is possible.

4.2.17 Kitchens

Generally kitchens were much less elaborate than today's standard. Only limited amounts of counter space and cupboards were provided; a free-standing kitchen table provided additional working area. Countertops were generally a very low 750 mm (30") from the floor. Cupboards featured panelled doors; upper cabinets extended to the ceiling and were sometimes glazed. Kitchen fixtures were subject to replacement on a regular basis such that the original stove is never seen. Refrigerators were not widely used until the late 1930s; instead the pantry and the cold room or root cellar and later the icebox (ice was delivered on a regular basis during the summer in urban areas) served the same function.

Because of the intensity of use and the development of work-saving devices, kitchens are the most frequently renovated portion of a house. As a result, few homes built prior to 1930 retain the original kitchen development.

4.3. PERIOD 3 CONSTRUCTION PRACTICES - 1940-45
(World War II housing)

4.3.1 Introduction

Wartime housing marks a significant departure from the traditional house construction techniques and floor plans of the previous periods. Because of wartime shortages of supplies and labour, these homes were designed to be easily assembled by untrained labour. The new materials and techniques introduced during this period mark the beginning of the modern house construction era. It should be noted, however, that all building practices did not change and so Period 3, Wartime Housing includes elements common to both the earlier periods and those that follow.

4.3.2 Foundations

A concrete basement 2.1 m (7') clear was usually provided, although occasionally the house was construced on only a crawl space.

4.3.3 Structure

Platform wood frame construction was introduced at this time. Walls were 38 x 89 mm[1] (2x4) studs with 19 mm (3/4") shiplapped sheathing; floor joists 38 x 184 or 38 x 235 (2x8 or 2x10) with 19 mm diagonally laid subfloor boards and either hardwood or softwood with linoleum laid over; rafters 38 x 89 mm (2x4) or 38 x 140 (2x6) with 19 mm board sheathing.

4.3.4 Exterior Cladding

The most common materials remained 100 mm (4") wood painted siding and stucco on metal lath. The wider 200 mm (8") siding was

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1 Lumber sizes were slightly larger than today's sizes and odd sizes are occasionally found (ie.: 2x9).

introduced at the end of the decade; both wood and asbestos "shingle look" sidings were available.

Brick was rarely, if ever, used.

4.3.5 Insulation

Insulation, when installed, was RSI 1.2 (R-7), 50 mm (2") thick rockwool batts with a kraft paper vapour retarder. Each batt was stapled to the studs. Wood shavings or vermiculite (Zonolite) were used for attic insulation.

Insulation was not always installed during this period. When it was, installation may have been haphazard.

Rockwool has a tendency to compact and deteriorate. Homeowners may find that the material is only located in the lower half of a wall; the rockwool in this case has shifted down leaving an uninsulated area at the top of the wall.

The kraft paper is not a very effective vapour retarder but is better than none. Problems may appear as a result of upgrading the insulation and sealing the house resulting in higher humidity levels. Higher humidity levels can lead to condensation within the walls and cause deterioration of the wall and its finishes unless upgrading is carried out properly.*.

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* Vapour retarders and air barriers are discussed in detail in an Innovative Housing Grants Program publication titled "A New Approach to Affordable Low Energy House Construction," July 1984.

4.3.6 Roofing

Asphalt roof shingles were standard, although cedar shingles were sometimes used. The original asphalt shingles will probably have been replaced by this time; cedar shingles, unless very well maintained, will have reached the end of their life expectancy.

Soffits and fascias were wood, painted; 100 mm (4") T&G boarding was common for soffits.

4.3.7 Interior Partitions and Millwork

10 mm (3/8") thick gyproc lath, 400 mm (16") wide by 1200 mm (4') long drywall panels, with two coats of plaster over was usually used; the overall plaster thickness varied from 16 mm (5/8") to 20 mm (3/4"). Traditional wood lath and plaster was occasionally used due to buyer preferences.

In some cases fibreboard was used as a base for ceiling plaster; wire mesh reinforcement at corners was sometimes used.

Millwork was modest; usually of fir, the profiles were simple: 12 mm (1/2") x 50 mm (2") O-Gee or Victory casings and 12 mm (1/2") x 100 mm (4") baseboards; the millwork was varnished or painted.

4.3.8 Windows and Doors

Exterior doors were panelled or laminated solid wood doors with glazed units. Interior hollow core flush wood doors were provided with wood casing and trim. Panelled fir doors were also available during this period.

Mortise locksets are used often with art glass door knobs.

4.3.9 Wall Finishes

Oil based paints and wallpapers.

4.3.10 Ceiling Finishes

Simple decorative plaster coves and ceiling texture were used in the living/dining area.

4.3.11 Flooring Materials

There was oak (occasionally maple) hardwood flooring 19 mm (3/4") or 10 mm (3/8") thick by 50 mm (2") wide. Linoleum was used in kitchen and bath areas.

4.3.12 Electrical

Braided two-wire lumex wire, ungrounded, was used. Fuse panelboards were common, but circuit breakers were gaining in popularity. Service was limited to 30-60 amps.

Knob and tube systems were still in use.

4.3.13 Plumbing

Cement asbestos pipe was sometimes used for the main sewer lines to the city service.

Galvanized steel pipe was used for hot and cold water supply lines. Drainage piping, waste and vent was cast iron for larger sizes, galvanized for smaller ones.

Hot water heaters did not have glass linings and are probably not in use today.

4.3.14 Heating

Forced Warm Air Systems were used in almost all cases. The forced air furnace consisted of a heat exchanger and blower fan section producing warm air which was directed to all areas of the dwelling unit through a system of rectangular and round ductwork. Rectangular headers were run in two directions from the supply plenum of the furnace. Round branch ducts, usually 125mm (5")

diameter, are installed from the header to each floor diffuser. Control was from a thermostat located near return air inlets.

Forced air systems were almost exculsively gas or oil fired. Furnaces were introduced in the very early 1950s just as the use of coal was being eliminated.

Furnaces usually had a 15 to 20 year life expectancy. Heat exchangers are usually thin walled cast iron which have a tendency to be corroded by the natural firing of the burner. As the industry progressed, cold rolled steel and aluminized heat exchangers cornered the market. These units have a 10 year warrantee. With proper care and regular maintenance of filters and fan belts, most furnaces of the period will last 20 years or more.

Furnaces installed in the last 15 years were required by code to be equipped with humidifiers. The most common type used was the plate humidifier.

Furnaces were not supplied with fresh air and combustion air as is now required by code.

Comfort level is much better than gravity systems, but problems can be experienced in rooms that are at the ends of duct runs. Design of return air systems also plays an important part in maintaining adequate comfort levels. In most homes of this period, the location of the supply and return air outlets is not ideal.

4.4 PERIOD 4 CONSTRUCTION PRACTICES (1946 - 1965)

4.4.1 Introduction

This section provides an outline of the typical construction materials and techniques used between 1946 and 1965. It should be noted that the period 1940-55 was a transitional period in the construction industry; as a result building practices varied considerably.

During this period, the major residential development companies emerged. This trend toward integrated land development and house building companies led to the standardization of house building techniques from approximately 1955 onwards.

4.4.2 Foundations

Poured concrete basements were standard; 200 mm (8") wall on strip footings with in some cases limited reinforcing in the top and bottom of the wall. Problems were uncommon and are usually related to improper surface drainage conditions at the top of the foundation wall.

4.4.3 Structure

Platform framing was standard. Walls were 38 x 89 mm (2" x 4") studs on 400 mm (16") centres; lumber sizes were slightly larger than today's size through the 1940s and early fifties. Sheathing was shiplapped boards until the early 1960s when 13 mm (1/2") plywood sheathing was introduced.

Floor joists were 38 x 184 or 38 x 235 mm (2x8 or 2x10) at 400 mm (16") centres. Floor joists were usually set in to the foundation wall. Board subfloors installed diagaonally with a finish flooring over were used until the introduction of plywood subfloors in the early 1960s.

Rafters, generally 38 x 89 or 38 x 140 mm (2x4 or 2x6") and 400 or 600 mm (16 or 24") centres were used. Roof trusses were not in general use until the 1970s.

Generally, the framing was structurally adequate; homes built during the early years of this period can have undersized floor joists or rafters.

Beams and lintels were built-up of standard joists. During the 1960s steel I-beams were occasionally used to support major spans in basements and over garage doors.

4.4.4 Exterior Cladding

Stucco, 3 coats on metal lath, was the primary material with painted wood siding 38 mm x 200-250 mm (2x8 or 2x10") or occasionally brick used as an accent in the lower part of the wall. Building paper air barriers varied and in some cases had a Kraft paper or aluminium foil backing.

4.4.5 Insulation

Rockwool RSI 1.2 (R7) batts with a kraft paper vapour retarder was usually installed. Immediately after World War II, insulation practices varied considerably, as cellulose batts, vermiculite and wood shavings were also used. Installation was often haphazard resulting in overall poor performance.

In the early 1960s fibreglass insulation, usually R 1.4 (R-8), with a Kraft paper (asphalted) vapour retarder replaced rockwool. In both cases, the kraft paper vapour retarder was stapled to the stud.

Kraft paper vapour retarders were not very effective. Generally this did not cause any problems unless the house was tightly sealed to prevent air infiltration or the level of humidity was raised significantly (installation of a humidifier). In such cases, the

lack of an adequate vapour barrier could cause deterioration of the exterior finishes and in extreme cases cause rot of the structural frame members. For further details refer to Home Manintenance and Repair, A Reference Manual for Homeowners available from the Alberta Department of Housing, Innovative Housing Grants Program.

4.4.6 Roofing

Asphalt shingles were the most common roofing material on slopes greater than 3 in 12. In most cases the original shingles have already been replaced. During the 1940s cedar shingles were still in common use. Built-up roofing for the low-slope (less than 3 in 12) roofs introduced by the modern architectural movement were popular during the early 1960s. Problems with flat roofs are almost inevitable, particularly at flashings. Repairs are possible but locating the source of the problem can be frustrating.

4.4.7 Interior Partitions and Millwork

During this period, traditional lath and plaster gradually disappeared. Gypsum board or fibreboard lath with two coats of plaster over was common during the 1940s and 1950s.

In the fifties gypsum board was also applied as a double layer with the second layer laminated crosswise to the first. Single thickness 13 to 16 mm (1/2" to 5/8") drywall boards installed with drywall nails or screws and taped joints were common by 1965, although custom homes occasionally still featured plaster.

Millwork was either fir or mahogany and profiles became smaller and simpler during this period. By the 1960s millwork was generally stained instead of painted.

4.4.8 Windows and Doors

Exterior doors were of solid wood, but the proportion of glazing was reduced substantially. Interior hollow core wood doors were

provided with simple wood casings and trim. Wood and steel frame sliders and sealed picture windows replaced double hung sash windows starting in the late 1950s.

Mortise locksets were not used after the 1940s when "modern" style locksets were introduced.

4.4.9 Wall Finishes

Paint and wallpaper were the most prevalent.

4.4.10 Ceiling Finishes

Decorative plaster coves and ceiling medallions were still in use in the 1950s. Asbestos-based spray-on ceiling texture was introduced in the early 1960s and was the standard ceiling finish by the end of the decade. If painted, this material does not present a health hazard.

4.4.11 Flooring

Until the early 1960s, flooring consisted of a subfloor of diagonally laid lumber with hardwood strip flooring or softwood flooring to receive linoleum. Wall to wall broadloom was introduced in the early 1960s and plywood subfloors were the standard floor finish by the end of the decade.

4.4.12 Electrical

Thermoplastic lumex (ungrounded) was introduced in the early 1950s; circuit breaker panels came into common usage during the same period replacing fuse boxes. To accommodate the wave of new household appliances, the standard electrical service was increased to 60 or 100 amps in the 1950s. By the late 1950s, grounded lumex wire was available making the home environment safer.

4.4.13 Plumbing

Copper supply lines came into common use and cast iron pipe remained as the common material for drainage lines.

4.4.14 Heating

Forced Warm Air Systems were standard. The systems of Period 4 were similar to the systems of Period 3, previously described.

4.4.15 Fireplaces

Generally fireplaces were not provided. However, wood burning, masonry fireplaces were re-introduced in the 1960s in the larger homes.

4.4.16 Bathrooms

Showers and vanities were standard features by the end of this period.

4.4.17 Kitchens

Veneer ply cabinetry replaced solid wood construction. Kitchens were generally larger and better equiped. The stainless steel sink was a standard feature by the end of this period.

4.5 PERIOD 5 - CONSTRUCTION PRACTICES FOR HOMES BUILD BETWEEN 1966 AND 1971

4.5.1 Foundations

A concrete basement 2.1 m (7'0") clear was usually provided, although occasionally only a crawl space was constructed.

4.5.2 Structure

Platform framing with plywood sheathings, essentially a modern construction system, were standard.

One of the major innovations at this time was the introduction of pre-engineered and pre-manufactured wood trusses. Wood rafters all but disappeared except for roof slopes in excess of 6 in 12.

4.5.3 Exterior Cladding

Although wood siding, stucco and brick (accent only) were still popular, aluminum and vinyl clad steel sidings were increasing in popularity.

4.5.4 Insulation

Friction-fit fiberglass RSI 1.9 (R-11) and a polyethylene air barrier/vapour retarder was standard. The typical home's air-seal, vapour seal and insulation was not to present standards but was considerably better than that of previous eras. Air leakage (at windows, doors, electrical plates, etc.) and inadequate roof insulation were common problems.

4.5.5 Roofing

Asphalt shingles were standard.

Plywood was used for roof sheathing.

4.5.6 Interior Partitions and Millwork

Gypsum board, 13 mm (1/2") was standard. Millwork was fir or mahogany, stained, 50 mm (2") for both bases and casings.

4.5.7 Windows and Doors

Exterior doors were solid wood, and glazing all but disappeared, sidelites became more popular as part of the entry area. Interior hollow core hardboard doors were introduced but the flush wood finished doors were most common.

Aluminum windows were the most common, but double-glazed wood casement and awning windows were available and occasionally used.

4.5.8 Wall Finishes

Latex paint and wallpaper.

4.5.9 Ceiling Finishes

Asbestos-based spray-on texture over gypsum board. This material does not pose a health hazard if painted.

4.5.10 Flooring

Oak flooring was still used occasionally, but generally wall-to-wall nylon loop or sculptured broadlooms were installed throughout the living area. Vinyl asbestos tile to the kitchen, bathrooms and entry areas was standard.

4.5.11 Electrical

Electrical wiring, grounded, thermoplastic lumex was standard.
Aluminum wiring was occasionally used for cost savings.
100 amp service was standard.

4.5.12 Plumbing

Copper supply lines and PVC drainage lines were standard.

4.5.13 Heating

Forced warm air system similar to today's systems, although not always equipped with fresh and combustion air as now required by code.

4.5.14 Fireplaces

If provided, it was a masonry unit.

4.5.15 Bathrooms

Showers and vanities were standard features.

4.5.16 Kitchens

Veneer plywood and solid wood cabinetry were used. Post-formed countertops were available.

○ occasionally used

● commonly used

Housing Period Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
FOUNDATIONS						
Mud sill	○	○				
Stone	●	○				
Concrete	○	●	●	●	●	●
Concrete block	○	○	○	○		
Preserved wood						○
STRUCTURE						
Load-bearing brick	○					
Balloon framing	●	●				
Platform framing			●	●	●	●
Board sheathing	●	●	●	○		
Ply sheathing				●	●	●
Roof rafters	●	●	●	●	●	○
Trusses					○	●
EXTERIOR CLADDING						
Wood siding 4-6"	●	●	●			
Wood siding 8-10"			○	●	●	●
Wood shingles	●	●				
Stucco	●	●	●	●	●	●

4.6 SUMMARY OF CONSTRUCTION TECHNIQUES BY PERIOD

Housing Period / Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
EXTERIOR CLADDING (contd)						
Asbestos siding			○	○		
Brick (veneer)		○		○	○	○
Stone	○					
Vinyl siding					○	●
Steel siding (vinyl finish)					○	○
Aluminum siding					○	●
ROOFING						
Copper						
Clay tile						○
Built-up				○	○	
Wood shakes						○
Wood shingles	●	●	○	○		
Asphalt shingles		○	●	●	●	●
INSULATION						
Walls No Insulation	●	●	○			
Wood shavings/ Paper	○	●	●			
Rockwool			●	●		
Cellulose batts			○			
Fibreglass batts w/Kraft paper VB					●	○
Fibreglass batts friction fit					○	●
Blown cellulose					○	●

4.6 SUMMARY OF CONSTRUCTION TECHNIQUES BY PERIOD

Housing Period / Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
Urea formaldehyde						○
Roof None	●	●	○			
Wood shavings	○	●	●			
Vermiculite			●	●		
Rockwool				●		
Fibreglass batts					●	○
Blown cellulose					●	●
Blown fibreglass					○	●
AIR BARRIER/VAPOUR BARRIER						
None	●	●				
Paint vapour retarder (oil base)	○	○				
Kraft paper air barriers/ vapour retarder		○	●	●		
Polyethylene air barriers/ vapour retarders				○	●	●
WINDOWS						
Double hung	●	●	●	○		
Casement		○				○
Slider				●	●	●
Awning						●
Single glazed	●	●	●			
Double glazed			○	●		
Sealed units				○	○	○
Wood c/w storms	●	●	●			

4. SUMMARY OF CONSTRUCTION TECHNIQUES BY PERIOD

Housing Period / Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
Wood w/sealed units				○	●	●
Aluminum					●	○
Vinyl clad						○
Steel				○	○	○
DOORS						
Panelled solid wood	●	●	●			○
Flush solid wood				●	●	
Flush wood H.C.				●	●	●
Flush hardboard H.C.						●
FLOORING						
Hardwood Strip Flooring	●	●	●	●	○	
Softwood Flooring	●	●				
Parquet						○
Linoleum	○	●	●	○		
Vinyl tile				●	○	
Sheet vinyl					●	●
Rubber						○
Carpet				○	●	●
Ceramic mosaic tile	●	●	○	○		
Ceramic quarry tile						○

4.6 SUMMARY OF CONSTRUCTION TECHNIQUES BY PERIOD

Housing Period Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
INTERIOR FINISHES						
Walls						
Wood lath/ plaster	●	●	○			
Gyproc lath/ plaster			●	○		
Gypsum Board			○	●	●	●
Millwork decorative	●	●				○
Millwork plain			●	●	●	●
Ceilings						
Wood lath/ plaster	●	●	○			
Gyproc lath/ plaster			●	○		
Tentest lath/plaster			●			
Decorative plaster	●	●	○	○		
Sprayed texture over drywall (asbestos)				●	●	
Sprayed texture over drywall (asbestos free)						●
INTERIOR COATINGS						
Paint/oil base	●	●	●	●		
Paint/latex					●	●
Wallpaper	○	○		○	○	○
ELECTRICAL SYSTEM						
Porcelain tube + knob	●	●	●			
Braided 2-wire lumex ungrounded			○	●		
Grounded lumex wiring				○	●	●

4.6 SUMMARY OF CONSTRUCTION TECHNIQUES BY PERIOD

Housing Period / Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
Aluminum wiring					○	
Fuse panel	●	●	●	○		
Breaker panel			○	●	●	○
30-60 amp service	●	●	●	○		
100 amp service (min)				●	●	●
MECHANICAL SYSTEM						
WATER SERVICE						
Galvanized steel pipe	●	●	●			
Copper pipe				●	●	●
PVC pipe						○
SANITARY SERVICE						
Cast iron pipe	●	●	●	●		
PVC pipe					●	●
Cement asbestos (to house only)			○	○		
STORM SERVICE						
None	●	●	●	●	○	
PVC					●	●
Weeping tile				○	○	○

4.6 SUMMARY OF CONSTRUCTION TECHNIQUES BY PERIOD

Housing Period / Building Components	1 1900-20	2 1921-39	3 1940-49	4 1950-65	5 1966-71	6 1972-83
HEATING						
Low pressure steam	○	○				
Gravity water	○	○				
Gravity air	●	●	●			
Forced air			●	●	●	●
FIREPLACES						
Gas		●	●			
Electric		○				
Masonry/wood	○	○		○	○	○
Metal/wood						●
BATHROOMS						
Showers		○	○	○	●	●

APPENDIX A

APPENDIX A

TABLE II
ESTIMATED SINGLE FAMILY DWELLINGS BY PERIOD OF CONSTRUCTION FOR ALBERTA

Alberta	Period 1 Before 1921	Period 2 and 3 1921-45	Period 4 1946-65	Period 4a 1946-60	Period 4b 1961-65	Period 5 1966-71	Period 6 1971-81	Totals
Total Dwellings 1971 Census	48,250	76,195	252,245	179,495	72,750	87,545	---	464,240
SFD 1971 Census	36,230	63,405	189,265	140,110	49,155	40,105	---	329,015
% SFD of Total 1971 Census	75.1	83.2	75.0	78.1	67.6	45.8	---	70.9
Total Dwellings 1981 Census	28,790	59,490	169,305	153,845	161,950[4]		354,170	758,245
Estimated SFD for 1981	21,620[1]	50,000[2]	---	120,150[3]	49,155[4]	40,860[4]	193,565	473,190
% Estimated SFD of Total to 1981	67.6	84.0[2]	---	78.1[3]	67.6	45.8	54.7	62.4
Loss All Dwellings 1971-81	19,460	16,705	---	19,960	negligible	negligible	negligible	(61,815)
% SFD to Total SFD in 1981	4.6	10.6	35.8	25.4	10.4	8.6	40.9	100

-

* Percentages are rounded off to the nearest decimal and will therefore not necessarily add up to 100.

* Estimated error factors for Estimated SFD for 1981 - before 1921: 3.2%; 1921-45: .4%; 1946-60: 19%

Table II

1. Calculation of SFD built before 1921 and remaining in 1981

   a) assuming constant % SFD of total dwellings (ie.: proportional loss of all dwelling types) in 1971 - SFD were 75.1% of all dwelling of this period therefore remaining SFD in 1981:

      = 75.1% x 28,790 (total dwellings in 1981 of this period)
      = 21,620 SFD.

   b) using loss rate factor based on Vischer Skaburskis Planners' study for CMHC 1979 proportion SFD/total loss

      = .715

      Dwelling loss 1971-1981 for this period

      =19,460

      Loss 1971-1981 for SFD
      = .715 x 19460
      = 13,915

      Therefore
      Remaining SFD in 1981

      = SFD stock (1971) - 13,915
      = 36,230 - 13,915
      = 22,315

   c) Error Calculation

      22,315 - 21,620/21,620 = 3.2%

   Based on 1921 Census data, 97% of dwelling units in Alberta were single family detached units. Multi-family units therefore accounted for an almost insignificant number of buildings.

   The relatively low percentage of units built during this period listed in 1971 and in 1981 sata as SFD, is due to the high number of conversions of the larger SFD units to 2 or 3 suite buildings. This trend appears to be slowing and in some inner city neighbourhoods reversing itself as families move back into the older neighbourhoods and convert buildings back to single family dwellings. A more realistic estimate of SFD type buildings remaining in 1981 would be in the range of 20,000 - 22,000.

2. Calculation of SFD built 1921-1945 and remaining in 1981.

   a) assuming constant % of SFD of total dwellings (ie. proportional loss of dwelling types) in 1971, SFD were 83.2% of all dwellings of this period.

      Therefore
      Remaining SFD in 1981
      = 83.2% x 59,490 (total buildings built 1946 - 1969)
      = 49,495

   b) using loss rate factors based on Vischer Skaburskis Planners' study for CMHC, 1979
      Proportion SFD loss/total loss = .715

      Dwelling loss 1971- 1981 for units built 1921-1945 = 16,705

      Loss 1971-81 for SFD
      = .715 x 16,705
      = 11,945

      Therefore
      Remaining SFD in 1981
      = SFD stock (1971) - 11,945
      = 63,405 - 11,945
      = 51,460

   c) Error calculation
      51,460 - 49,495/49,495 = 4.0%

3. Calculation of SFD built 1946-1960 and remaining in 1981

   a) assuming constant % SFD of total dwellings (ie. proportional loss of all dwelling types) in 1971 SFD were 78.1% of all dwellings of this period.

      Therefore
      Remaining SFD in 1981:
      = 78.1% x 153,845 (total dwellings built 1946-1960)
      = 120,150 SFD.

   b) using loss rate factor based on Vischer Skaburskis Planners' study for CMHC, 1979

      proportion SFD/total loss = .715

      Dwelling loss 1971-81 for units built 1946-60

      Loss 1971-81 for SFD
      = .715 x 25,650
      = 18,340

Therefore
Remaining SFD in 1981
= SFD stock (1971) - 18,340
= 121,770

c) Error Calculation

121,770 - 120,150/120,150 = 1.3%

4. Calculating of SFD built 1961-71 remaining in 1981

a) 1971 Census: Total dwellings

1961-65	72,750
1966-71	87,545
1961-71	160,295

* only 5 months of 1971 are included

b) 1981 Census: Total dwellings

1971-81	161,950

* includes all of 1971

c) It is therefore reasonable to assume that the loss rate for dwellings built between 1961 and 1971 has been negligeable during the period 1971-81. Furtheremore, there is no evidence that this trend has changed over the past 2 years.

Therefore
for 1981 SFD built 1961-65 = 1971 Census value
= 49,155

and for 1981 SFD built 1966-71
= 40,105 + 45.8% (161,950 - 160,295)
= 40,105 + 45.8% (1655)
= 40,860

d) Maximum Error, assuming difference in 1971 unit total

161,950 - 160,195/160,295 = 1%

APPENDIX A

TABLE III
ESTIMATED SINGLE FAMILY DWELLINGS BY PERIOD OF CONSTRUCTION FOR CALGARY

Calgary	Period 1 Before 1921	Period 2 and 3 1921-45	Period 4 1946-65	Period 4a 1946-60	Period 4b 1961-65	Period 5 1966-71	Period 6 1971-81	Totals Alberta
All Dwellings 1971 Census	11,330	12,505	68,630	49,225	19,405	28,465	---	121,100
All Dwellings 1981 Census 210,815	6,240	11,180	---	42,565	49,670			101,160
All Dwelling Loss 1971-81	5,090	1,325	---	6,660	1,800		---	14,875
SFD 1971 Census Data	6,065	8,155	---	34,655	12,095	12,080	---	73,055
% SFD of Dwellings in 1971	53.5	65.2	---	70.5	62.3	42.4	---	60.3
Estimated SFD for 1981	3,340	7,290	41,575	29,965	11,610	11,595	57,665	115,845 (121,465)
Approx. % SFD of Total SFD 1981	2.7	6.1	35.0	25.1	9.7	9.7	48.6	

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TABLE IV
ESTIMATED SINGLE FAMILY DWELLINGS BY PERIOD OF CONSTRUCTION FOR EDMONTON

Calgary	Period 1 Before 1921	Period 2 and 3 1921-45	Period 4 1946-65	Period 4a 1946-60	Period 4b 1961-65	Period 5 1966-71	Period 6 1971-81	Totals Alberta
All Dwellings 1971 Census	8,995	16,955	85,545	59,520	26,025	33,010	---	144,510
All Dwellings 1981 Census 196,495	4,255	11,635	---	49,195	51,305			80,110
All Dwellings Loss 1971-81	4,740	5,320	---	10,325	7,730		---	28,115
SFD 1971 Census Data	5,060	12,330	---	45,125	15,430	11,965	---	89,910
% SFD of Dwellings in 1971	56.3	72.7	---	75.8	59.3	36.2	---	62.2
Estimated SFD for 1981	2,395	8,460	50,715	37,290	13,425	10,410	38,885	100,680 (110,86
Approx. % SFD of Total SFD 1981	2.2	7.6	45.7	33.6	12.1	9.4	35.1	

TABLES III and IV - Estimated SFD by Period of Construction for Calgary and Edmonton in 1981

Sources of Data

1. All dwellings 1971
   1971 Census: Period 4 is the sum of data for the period 1946-60 and 1961-65; Period 5, 1966-71 includes only first 5 months of 1971.

2. All dwellings 1981
   1981 Census; data for the period 1961-71 is given as one number. The data is based on the home owner's estimate of period of construction. The probability of error increases significantly for homes built prior to 1960; it is not clear whether this has a significant impact on the statistics.

3. All dwelling loss 1971-81
   Difference of columns 1 and 2; it should be noted that conversions from SFD to multi-family units is included in the loss calculations. It is unlikely that the loss data reflects the true loss of buildings through this period; in fact, the loss of SFD type buildings built between 1961 and 1971 is probably negligeable.

4. Estimated SFD for 1981
   It is assumed that the % of SFD to total dwelling units built during a particular period has remained constant. In fact, SFD units are generally less suscepible to demolition than are multi-family units; however SFD units are mre prone to loss through conversion to either multi-family or non-residential uses.

   The accuracy of this assumption was checked agains the known SFD total for 1981. The bracketed number represent the sum of the previous columns or the estimated SFD total in 1981 for all periods of construction. The upper number represents the total number of SFD units according to the 1981 census.

   The error for Calgary is approximately 5%; for Edmonton 10%. It may be assumed that a substantial proportion of the error is due to conversions of SFD to multi-unit buildings.

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TABLE V

SUMMARY OF HOUSING STOCK LOSS STATISTICS FOR ALBERTA
(All types of dwellings) [4]

	Loss Rate (%)
1961-71 urban areas (30,000+)	.59
1961-71 other areas	2.08
1961-71 provincial total	1.92
Units built prior to 1920	2.83
Units built 1921-45	1.85
Units built 1946-60	.57
Proportion urban/total loss	.232
Proportion SFD/total loss	.715
Proportion 1971-76/1961-71 loss[1]	.996
Average annual loss 1961-71	4,390
Average annula loss 1971-76[2]	4,372
Estimated annual loss 1971-76[3]	4,386

1. Based on Statistics Canada demolition data.
2. Based on proprotion 1971-76/1961-71 loss statistics.
3. Rural losses are assumed to be the same for 1971-76 as for 1961-71 period. The demolitions ratio is applied to urban area losses only.
4. All statistics based on Demolitions, Conversions, Abandonments, Working Paper 3, prepared by Vischer Skaburskis Planners for CMHC, Aug. 10, 1979.

APPENDIX A

CHART II - DISTRIBUTION OF SFD BY HOUSE TYPE FOR CALGARY 1983

House Type	New[2]	Old[1]	Total
2 Storey	17634	1792	19426
1-3/4 Storey	- -	1378	1378
1-1/2 Storey	2065	1288	3353
Splits/Bi-Levels	20093	- -	20093
Bungalows	73294	5244	78538
TOTALS	113086	9702	122788
Attached Garage			22267
Detached Garage			58532

1. Old represents pre-World War II constructions. The proportion of "old" homes is probably higher due to errors in assigning ages to 1930/40 homes; many are listed as modern. Probably up to 10% of homes in this age group are incorrectly dated. A specific example of this type of error is evident in the case of 1-1/2 storey homes. The wartime and veterans housing of the 1940s was the last period in which this type of unit was built.
2. Age is recorded "new" if a major renovation occurred.
3. Data derived from the City of Calgary Assessment Rolls, compiled March 1983.

Further comments regarding distribution of housing "types".

1. In urban areas, the majority of bungalow type units built before World War II are 'Craftsman' style bungalows of the post-World War I era. The bungalow is the most popular type of home during this period.

2. Bungalows built prior to World War II in rural areas are more often of the 'Settlers' style.

3. During the 1920s, the 'Homestead' and 'American Foursquare' types appear to have been about equally popular in both urban and rural areas.

4. Forties, 50s and 60s SFD were almost invariably bungalows. The 1940s type C (1-1/2 storey) unit appears to be the only significant departure from the trend.

5. After 1965, split levels and two-storey units were increasingly popular. Because of reduced lot size and increased house size, the split replaced the bugnalow as the preferred house pattern.

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